

REMARKS

Applicants have received and reviewed the Office Action dated October 8, 2010. By way of response, Applicants have cancelled claim 8 without prejudice. Applicants have amended claims 1 and 7. No new matter has been added. Claims 1-7 and 9-31 are pending, although claims 9-19 and 21-31 have been withdrawn from prosecution. Applicants submit that the amended claims are supported by the specification as filed.

For the reasons presented below, Applicants respectfully submit that the amended and newly presented claims are in condition for allowance, and notification to that effect is earnestly solicited.

Rejection of Claims Under 35 U.S.C. § 112, Second Paragraph

The Examiner rejected claims 1, 7 and 8 were rejected under 35 U.S.C. § 112, second paragraph. Applicants respectfully traverse this rejection.

The Examiner suggested adding a definition of BH2 to the specification. Applicants have amended the specification as suggested by the Examiner. In addition, Applicants respectfully submit that a worker in this field would know the definition of BH2 with respect to bake hardening and that this amendment to the specification is not necessary for understanding the specification. Nor does the amendment add any new matter. This amendment was made solely to expedite prosecution of the present claims and not to acquiesce to the rejection.

The Examiner suggested amending the amounts of aluminum recited in dependent claims 7 and 8 for consistency with independent claim 1. Claim 7 has been amended to recite the same amount of aluminum as claim 1. Claim 8 has been canceled.

Accordingly, Applicants respectfully submit that the amended claims fully comply with § 112, second paragraph, and withdrawal of this rejection is earnestly solicited.

Rejection of Claims Under 35 U.S.C. § 103(a)

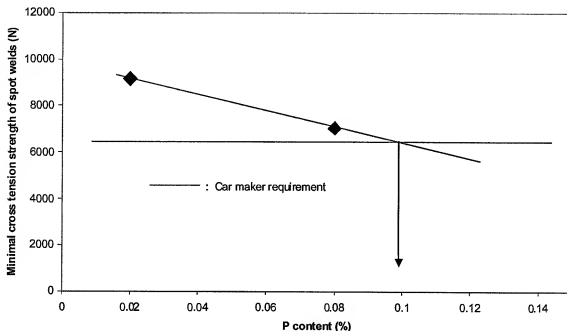
The Examiner rejected claims 1-8 and 20 under 35 U.S.C. § 103(a) over Nomura et al., US 5,470,529 in view of Yokoi et al., US 6,589,369. Applicants respectfully traverse this rejection.

In the cold-rolled steel composition of claim 1, the phosphor content is in a the range of 0.04-0.1wt%. This means that P is added above the impurity level, whereas in both of the cited prior art documents, P is described as an impurity which is to be avoided as much as possible. Therefore, the present invention goes against this prior art teaching by describing a deliberate P-addition in a range of 0.04 to 0.1wt%.

The unexpected nature of the properties obtained at the present levels of phosphor is described in the accompanying Declaration Under 37 C.F.R. § 1.132 by Joachim Antonissen. Minimum cross tension strength of spot welds was measured in compositions of the claimed cold rolled steel. This type of strength is a known criterion for the assessment of weldability, as a function of the P-content, in a steel sheet with varying P-content. The compositions of the steel samples used in these tests were as follows. For the test sample at 0.02wt% P: C : 0.2wt%; Mn : 1.5wt%; Si : 0.3wt%; Al : 1wt%. For the test sample at 0.08wt% P: C : 0.19wt%; Mn : 1.5wt%; Si : 0.3wt%; Al : 1.2wt%. In the cold-rolled steel composition of claim 1, the phosphor content is in a the range of 0.04-0.1wt%. The levels of S, N, Ti, Nb, V and B for both samples were also all within the ranges in claim 1.

The minimum cross tension strength of spot welds was measured by an accepted procedure. For the claimed cold rolled steel with 0.02 wt% P, the minimum cross tension strength of the spot weld was 9154 N. For the claimed cold rolled steel with 0.08 wt% P, the minimum cross tension strength of the spot weld was 7028 N.

The following graph shows a slanted line through these measured strengths to illustrate that the claimed cold rolled steel composition unexpectedly provides good weldability at P-levels well above the impurity level. Good weldability at high levels of phosphorus with aluminium at 1 and 1.2 wt-% is particularly unexpected.



The horizontal line represents the minimum spot weld minimum cross tension strength required by a car maker. This graph also illustrates that above 0.1 wt% phosphorus weldability becomes unsatisfactory.

In contrast, the two patents cited in the rejection (Nomura et al. and Yokoi et al.) each discuss phosphorus as an undesirable impurity, to be minimized as much as possible. Based on the combined teaching of Nomura and Yokoi, and on the knowledge that higher Al-levels tend to deteriorate weldability, it could have been assumed that 0.08wt% P in combination with 1.2wt% Al would not have led to an acceptable spot weld.

The present invention proves that this is nevertheless the case. Hence, claim 1 is not obvious over the cited art.

In the primary reference (US'529 (Nomura)) at col. 8, l. 29-34, it is stated that P is 'another incidental impurity', 'limited to 0.1% or less, although it should be minimized as much as possible'. It is also advisable according to Nomura 'that the P-content be 0.02% or less'. Further, in US'369(Yokoi), col. 10, l. 10-13, P is described as an undesirable impurity and 'the lower its content, the better'. Although both documents put an upper limit of 0.1 wt% for P, they

are both advising the skilled reader to keep the P-level as low as possible. Therefore, the present invention goes against this prior art teaching by describing a deliberate P-addition in a range of 0.04 to 0.1wt%. According to a preferred embodiment, P is even higher than 0.06wt%.

Accordingly, based on the foregoing differences, Applicants submit that the cited references neither teach nor suggest the presently claimed cold rolled steel compositions, and withdrawal of this rejection is earnestly solicited.

Summary

In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Please consider this a PETITION FOR EXTENSION OF TIME for a sufficient number of months to enter these papers or any future reply, if appropriate.

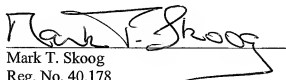
Please charge any additional fees or credit any overpayment to Deposit Account No. 13-2725.

Respectfully submitted,

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8 March '11


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